

LIPPINCOTT (J.A.)

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Dr B. Joy Jeffries.

OUR PUBLIC INSTITUTIONS AS SOURCES
OF IMPAIRMENT OF VISION.

BY

from

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ADDRESS IN OPHTHALMOLOGY.

By J. A. LIPPINCOTT, M.D.,
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OUR PUBLIC INSTITUTIONS AS SOURCES OF IMPAIRMENT OF VISION.

IN pursuance of the custom established by the gentlemen in whose steps the writer of the Address in Ophthalmology has the honor to tread, he has decided, in performing the duty devolving upon him, not to attempt a rehearsal of the progress made during the past year in this branch of medical science, but to invite your attention to a single subject, one which appears to him to be of great practical importance.

As many of you are aware, a good deal of thought has been lately directed to the extent and the causes of blindness in this and other countries, with the view of removing the latter and thus lessening the former as far as possible.

At the last meeting of the American Ophthalmological Society, Dr. Howe, of Buffalo, as chairman of a committee previously appointed to investigate the causes and prevention of blindness, presented a report which appeared to establish the fact that, in this country, the number of the blind is increasing in far greater ratio than the number of inhabitants.¹ For example, in 1870 the census showed a population of 38,558,371, of whom 20,320 were blind; while the census of 1880 showed a population of 50,155,783, of whom 48,929 were blind—*i. e.*, whereas the increase in population during the decade increased 30.09 per cent., the increase in the number of the blind amounted to 140.78 per cent. While great allowance may be made for inaccuracy in the figures furnished by the census reports, especially that of 1870, we are probably justi-

¹ Trans. Amer. Ophthal. Soc., 1890, p. 532.

fied in concluding, with Dr. Howe, that blindness is increasing out of proportion to the increase in the population of the country.

It is an unpleasant but indisputable fact that a very large proportion, probably a majority, of the blind have become so through the agency of communicable and therefore largely preventable forms of ocular disease. I allude to the various forms of contagious conjunctivitis, including ophthalmia neonatorum, and granular and purulent inflammations of the conjunctiva. The former of these diseases, ophthalmia neonatorum, has, in the State of New York, been considered grave enough to warrant special legislation compelling midwives and nurses "to report all cases of redness and inflammation of the eyes occurring within two weeks after birth to the nearest health officer or to some legally qualified medical practitioner." In view of the number of children annually deprived of sight by the purulent conjunctivitis of infancy, the propriety of our own State enacting a similar law can scarcely be called in question.

Whether we endeavor to secure legislation bearing on the subject or not, it is plainly our duty as physicians to prevent, by every means at our disposal, the appearance of a malady so destructive to vision. Among such prophylactic measures may be mentioned disinfection of the parturient canal before parturition, and immediately after it, thorough cleansing of the infant's eyes with a mild antiseptic, such as a saturated boric acid solution, or even the instillation of a drop of a 2 per cent. solution of nitrate of silver, as suggested by Credé.

But while the subject just referred to is of so much importance as to demand at least a passing allusion, the more immediate purpose of the present paper is to consider the possibility of lessening the evil effects attendant upon another of the causes of blindness, viz., granular conjunctivitis or trachoma.

Zehender¹ states that in Finland, in 1868, the blind were in proportion of 1 to 348 of the population, and that the most frequent cause was trachoma. Haynes-Walton² says that

¹ Handbuch der Augenheilkunde, Bd. i., 119. Stuttgart, 1874.

² Diseases of the Eye, p. 874. London, 1875.

granular conjunctivitis is the most common cause of blindness in Ireland. According to a recent estimate,¹ about 8 per cent. of the blind in the State of New York owe their unhappy condition to trachoma; but this statement by no means gives an adequate idea of the malignancy of this affection, because, apart from the consideration that the estimate is probably too low, many cases of blindness being credited to ulcerative and other corneal affections which owed their existence to trachoma, the gravity of the latter disease consists not only in its tendency to produce total blindness, but in the fact that recovery from it is rarely, if ever, complete. The patient is left with cicatricial and shrunken conjunctivæ and with tarsal cartilages incurvated, or at least with lids inverted, causing the lashes to rub and fret the corneæ. The latter rarely fully retain or regain their pristine lustre. The upper lids droop, and the patient acquires a peculiarly dejected look, which seems to express a dreary acquiescence in the decrees of a relentless fate. It is rare to see a person, who is or has been affected with trachoma, capable of a smile in the full and joyous sense of that word. Besides, even when the disease has been apparently obliterated, very slight provocation is needed to light up new trouble, especially in the shape of corneal ulcers, which are apt to prove exceedingly painful and intractable. Once, therefore, the affection has secured a foot-hold the patient is more or less seriously crippled for life.

The design of this paper does not contemplate a systematic description of the affection, but a brief account of its chief characteristics and its etiology can scarcely be omitted. Perhaps no subject in ophthalmology has elicited more discussion or evoked more diversity of opinion. To the older writers, among whom may be named the great pioneer in this branch of medicine, Mackenzie, granular conjunctivitis was merely a late stage of purulent inflammation of the conjunctiva,² which, in its turn, was only a severe form of catarrhal conjunctivitis.³

Since that time, as a result of the investigations of numerous observers, our knowledge has gradually grown more definite. Nevertheless, there is even now no consensus of opinion

¹ Trans. Amer. Ophthal. Soc., 1890, p. 535.

² Mackenzie on the Eye, p. 451. Philadelphia, 1855.

³ Ibid., p. 443.

in regard to several fundamental questions, such as that of the very nature and pathology of the disease. The terminology naturally partakes of this uncertainty, different authors employing the same term to express different conditions, or, as is more generally the case, some authors using a particular term to designate a wider range of phenomena than others. The study of the literature of the subject is hence attended with peculiar difficulties.

All of the recent writers, however, to whose works I have had access, agree in applying the terms trachoma and granular conjunctivitis to a condition characterized by the following appearances:

On everting the upper lid the conjunctiva is found to be more or less completely studded with roundish, yellowish, or reddish-gray, more or less opalescent bodies, varying in size, but generally about one millimetre in diameter, and, from their appearance and arrangement, considered to resemble frog-spawn. They may occupy by preference the portion of the conjunctiva covering the superior tarsus, or they may be observed on every part of the conjunctiva, palpebral and bulbar, and are found, according to some authors,¹ even on the cornea. The conjunctiva, in other respects, may be approximately normal, but in general it is more or less catarrhal; or in addition to the trachoma granules, there may be present what are considered by many writers to be totally different structures, viz., enlarged follicles, which affect chiefly the upper and lower retrotarsal folds and the conjunctiva of the lower lid, and which may acquire such a development as to cause the fornix to bulge out in folds when the lid is everted.

The condition described above may remain latent for a long period, and, according to DeWecker,² there are cases in which the trachoma granules finally disappear by cicatrization without the occurrence of any considerable inflammation; but, most frequently, pronounced additional changes indicative of the inflammatory state make their appearance. The follicles increase in number and size, and the papillæ become engorged and swollen, thus constituting the *mixed trachoma* of Stellwag.³

¹ Raehlman, *Archiv für Ophth.*, xxxiii. 2, 113; Rhein, *ibid.*, xxxiii. 3, 87, and others.

² DeWecker et Masselon: *Manuel d'Ophthalmologie*, p. 141. Paris, 1889.

³ Stellwag: *On the Eye*, p. 402. New York, 1873.

The name *diffused trachoma* has been given by the same author to a condition in which the lymphoid hyperplasia reaches a still higher degree. The infiltration and swelling of the conjunctiva is more decided, and the trachoma granules, losing their characteristic features of form and color, are indistinguishable from the other structures mentioned. The whole surface of the conjunctiva, especially of the upper lid, is sometimes covered with large, irregularly shaped, fleshy-looking protuberances, and the plica semilunaris may be so swollen as to project over the caruncle in the shape of a fold.¹ Sometimes we observe grayish- or oyster-colored patches, especially in the upper retrotarsal fold, caused by infiltration of the tissues with gelatinous or serous material. These patches, which may be four or five millimetres in width, usually lie horizontally, and may reach a length of two centimetres.

In many cases the morbid process is ushered in by an inflammatory attack,² in which case the peculiar opalescent bodies or trachoma granules can usually not be identified until the active symptoms have subsided.

The secretions from the mucous membrane are in direct relation to the degree of inflammatory reaction, being catarrhal in character in the lighter grades, and more or less purulent in the more severe.

The changes in the cornea incident to granular conjunctivitis, and to which the name pannus is applied, are of the most serious character. They are in many cases of a purely mechanical nature, and are caused by the roughness of the upper lids. In others they are evidently not caused by friction, as the upper lids may be quite smooth. In such cases the morbid process apparently begins with changes of an ulcerative character, which give a stippled or cloudy appearance to the membrane, or the initial step may be the deposit of trachoma granulations in the corneal tissue. Whatever its mode of production, pannus is a condition in which the ves-

¹ Schweigger: Handbook of Ophthalmology, p. 276. Philadelphia, 1878.

² According to DeWecker the inflammation merely accompanies, never causes, the evolution of the granulations. He says: "D'après notre propre expérience (en France) nous pouvons affirmer qu'il ne se forme pas de véritables granulations à la suite d'une poussée aiguë ayant quelque ressemblance avec une ophthalmie purulente." *Traité Complet d'Ophthalmologie*, t. i. p. 367.

sels which ramify in the upper part of the globe extend into the superficial layers of the cornea, and give rise to an opacity of greater or less density, which at first occupies only the upper portion of this membrane, but which may extend over its whole surface, and may be so extreme as practically to produce blindness. In some cases, especially in the late stages of the disease, repeated corneal ulcers add to the sufferings of the patient. These may end in perforation of the membrane, escape of the aqueous humor, and hernia of the iris. In other cases, without perforation of the cornea, the inflammatory process extends to the iris and the deeper structures of the eye.

The general features of the disease, which we have mentioned above, may persist for months, or even years, being modified by more or less frequent and severe intercurrent inflammatory outbreaks; but in process of time the swelling begins to subside, and cicatricial lines are seen forming in every direction. The first of these lines usually runs in a direction parallel to the border of the lid and about two millimetres from it. This line is soon joined by others, some of which run vertically toward or to the retrotarsal fold. The whole palpebral conjunctiva gradually loses its physiological characters, and is changed into a dry, whitish, cicatricial material of glassy smoothness—a condition to which the term xerosis is applied—dotted, sometimes, here and there, with minute red vascular points, or with still unabsorbed granulations. The cicatrizing process is attended with a gradual shrinking of the conjunctiva, which in extreme cases is so great that the conjunctival sac is obliterated, the lids being adherent to the globe almost to their very margins.

As a rule the retrograde changes involve not only the conjunctiva but the deeper tissues of the lid. The cilia, thus, from implication of the structures about their roots, become stunted and sparse, or assume unnatural directions, especially showing a perverse tendency to turn inward and fret the cornea. This tendency is favored by the fact that the tarsus also acquires an incurvated form, constituting what is known as entropium.

The writers who would restrict the names trachoma and granular conjunctivitis to the group of phenomena which I have attempted briefly to portray, and who consider the pecu-

liar structure to which I have referred as the trachoma granule to be the *sine qua non* of the disease, are not numerous; but they include among their number such eminent authorities as Saemisch and DeWecker. The latter,¹ following the lead of the former,² gives the points of difference between the follicle and the true granulation, which points I place in tabular form, as follows:

In respect to	Follicle.	Granulation.
Form and size.	Sometimes round, but generally oval. Smooth on the surface. Usually rises rather gradually from the general level of the conjunctiva. About 1 mm. in diameter.	Roundish. Rises rather abruptly, its base measurement never exceeding its height. About 1 mm. in diameter, sometimes less.
Color.	Grayish-yellow or grayish-red. Rather translucent. Sometimes vesicular in appearance. Color apt to be pretty constant.	Somewhat like follicles, but more inclined to red, and more opaque. Color varies at different times.
Common arrangement.	In rows corresponding with long axis of follicle, and parallel to retrotarsal fold.	Irregular; isolated, or in little groups.
Favorite seat.	Retrotarsal folds especially lower, and conjunctiva of lower lid.	Upper portion of the conjunctival sac.
Condition of surrounding conjunctiva.	Generally normal or nearly so in chronic follicular conjunctivitis.	Reddened, and papillary layer more frequently swollen, especially on lower lid, in chronic granular conjunctivitis.
Results.	Follicular conjunctivitis disappears, leaving no trace.	Granular conjunctivitis always followed by cicatricial tissue changes.
Pathological anatomy.	Is enclosed in what appears to be a capsule, and consists of a closed lymph-follicle.	Has no limiting capsule. Consists of a mass of cell elements deposited under and raising up the epithelium, and in contact below with the conjunctival stroma which thins out and disappears toward the surface of the elevation. Arborescent bloodvessels, arising from the stroma, appear among the cells and send fine branches toward the surface.

¹ *Traité Complet*, t. i. pp. 360-65.

² *Handbuch der gesammten Augenheilkunde*, Bd. iv. 40-44.

The distinctions indicated above are not so far generally recognized, some authorities, prominent among whom is Michel,¹ expressly affirming that the follicle and trachoma granulations are identical. Consequently follicular and granular conjunctivitis are generally described as varieties of one and the same disease; and some authorities include in the same class, also, hybrid forms of conjunctivitis of blennorrhoeic type, like the so-called Egyptian or military ophthalmia. Hence, also, such classifications as papillary trachoma, follicular trachoma, etc.

The symptoms of granular conjunctivitis may be very briefly alluded to. They are often insignificant in proportion to the tissue changes, especially if the usual signs of inflammation be moderate or absent. A patient whose conjunctiva has lost all resemblance to normal tissue may make no sign. This fact is of considerable significance in reference to the subject of this paper. Complaint is frequently made only when a more or less severe attack of catarrhal conjunctivitis is added to the original condition, and then there is some lachrymation, photophobia, fatigue in using the eyes, and secretion of mucus which causes the lids to adhere in the mornings. Very frequently serious trouble is not suspected until the sight begins to be blurred through the development of pannus. During the intercurrent attacks of inflammation the symptoms are greatly aggravated, especially the photophobia. In the later stages of the disease ptosis usually manifests itself, being caused chiefly by atrophy of the muscular fibres which elevate the upper lid. The suffering associated with corneal ulceration, and the long misery due to ingrowing eyelashes, can be appreciated by the dullest imagination.

Etiology.—Trachoma, like most forms of conjunctivitis, is undoubtedly contagious. It is communicated through the secretions, and is, therefore, more readily propagated when active inflammatory changes are in progress. It is not generally believed that the secretion from a trachomatous eye will necessarily produce trachoma; certain favorable conditions must be present.

As in the case of other communicable diseases the tendency

¹ Archives of Ophthalmology, vol. xv. p. 486.

is to ascribe to some form of microörganism the chief rôle in the development of granular conjunctivitis, and laborious bacteriological investigations have been carried on by a number of observers, with results, however, which, up to the present time, so far as my knowledge extends, are far from satisfactory. Sattler,¹ one of the highest authorities in this field of research, discovered a micrococcus which appeared to be the active agent in the production of the malady, and his discovery was apparently confirmed by Michel.² But Sattler,³ in a later communication, read at the Heidelberg Congress three years ago, acknowledged it to be very questionable whether, after all, this micrococcus was the morbid factor, although he felt assured that it had a certain relation to the morbid process. In the discussion which followed this paper, Schmidt-Rimpler⁴ corroborated the above conclusion.

But if the active cause, the *causa causans*, of trachoma is still uncertain, the predisposing causes are pretty clearly established. They have reference to age, race, locality, and general hygienic conditions. Children under five years of age are generally exempt, as are also the aged, the disease being seen most frequently between the ages of twenty and forty. The investigations of S. M. Burnett tend to show a singular immunity on the part of the negro race.⁵ The recent attempt of Chibret to demonstrate a similar exemption in favor of the Celtic race⁶ can scarcely be regarded as successful in view of the statistics of the ophthalmic *cliniques* in this country. That the Irish at home do not exhibit any greater freedom from the affection than they do here is evident from the remark quoted above from Haynes-Walton in reference to the part played by trachoma in producing blindness.

It has long been a matter of observation that altitude and topography bear an important relation to the etiology of

¹ Bericht über die xiii. Versamml. der Ophthal. Gesellschaft zu Heidelberg, 1881, p. 21.

² Der Microörganismus der sogenannten Aegyptischen Augenentzündung. Wiesbaden, 1886, p. 24.

³ Bericht über den vii. period. Internat. Ophthal. Congress, Heidelberg, 1888, p. 368.

⁴ Ibid., p. 395.

⁵ Archives of Ophthal., vol. xiii, p. 193.

⁶ Annales d'Occulistique, vol. cv, p. 22.

granular conjunctivitis, mountainous regions, like Switzerland, furnishing but few cases, while low flat countries, like Belgium, are peculiarly prone to the malady.

But the noxious influence of the predisposing causes mentioned, causes which are of a general nature, in my judgment, sinks into insignificance when compared with that exerted by conditions which are more individual in their operation, chief among which are the irritating effects of smoke, fragments of stone, etc., and imperfect sanitary surroundings. The disposition to trachoma is found among the very poor, and is mainly due to bad, insufficient, or unvaried diet,¹ imperfect ventilation, and inattention to personal cleanliness. The most favorable conditions for its development are realized where people are crowded together in tenement-houses and barracks, and in large schools and orphan asylums, where the food, though possibly abundant and good in itself, may lack variety; where the ventilation, especially of the dormitories, is frequently utterly inadequate, and where, owing to the necessarily free communication between the inmates, contagion, in the event of an infectious disease being admitted unrecognized, finds so favorable a field of operation. How easily a case of trachoma can effect an entrance into such institutions is obvious when we consider the frequent want of correspondence, already alluded to, between the external appearances and symptoms and the conjunctival changes found on careful examination.

Once admitted, the disease finds abundant means to spread; but its most faithful and efficient ally is undoubtedly the common towel, by which, in the words of the *London Times*, "a contagious discharge is no sooner wiped out of the eyes of one child than it is wiped into the eyes of another."² So that an article which might serve as the banner of civilization, which, as an instrument of cleanliness is indispensable to health and comfort, "strained from that fair use," becomes a source and means of incalculable mischief.

The propagation of granular conjunctivitis in this country is effected, in my opinion, mainly through two agencies—first, immigration, and, secondly, our orphan asylums and schools

¹ See interesting remarks by Brudenell Carter, *Diseases of the Eye*, p. 217. Philadelphia, 1876.

² Quoted by Carter, *loc. cit.*, p. 219.

and kindred institutions. With the object of forming some conception of the extent to which this disease prevails, and of its prevalence relatively to other affections of the eye, I have examined the annual reports of five of the principal eye dispensaries in the cities of Boston, New York, and Philadelphia for the past five years. The results of this examination are presented in the following tables, which show the total number of eye cases and the number of cases of trachoma, together with the percentage of the latter, treated year by year in each institution :

OPHTHALMIC AND AURAL INSTITUTE, NEW YORK.

Year ending—	Total number of eye cases.	Cases of granular conjunctivitis.	Percentage.
September 30, 1886	5436	279	5.2
“ “ 1887	5141	220	4.3
“ “ 1888	5212	205	3.9
“ “ 1889	5517	322	5.8
“ “ 1890	6052	297	4.9
Total	27,358	1323	4.8

MANHATTAN EYE AND EAR HOSPITAL.

Year ending—	Total number of eye cases.	Cases of granular conjunctivitis.	Percentage.
September 30, 1886	5454	231	4.2
“ “ 1887	5698	246	4.3
“ “ 1888	6001 ?	224	3.7
“ “ 1889	6511	284	4.4
“ “ 1890	7197	322	4.5
Total	30,861	1307	4.2
13 years ending 1883	31,168	1599	5.1

NEW YORK EYE AND EAR INFIRMARY.

Year ending—	Total number of eye cases.	Cases of granular conjunctivitis.	Percentage.
September 30, 1886	10,736	682	6.4
“ “ 1887	11,059	707	6.4
“ “ 1888	11,059	425	3.8
“ “ 1889	11,781	477	4
“ “ 1890	13,114	525	4
Total	57,749	2816	4.9

MASSACHUSETTS CHARITABLE EYE AND EAR INFIRMARY.

Year ending—				Total number of eye cases.	Cases of granular conjunctivitis.	Percentage.
September 30,	1886	.	.	8,558	244	2.9
"	" 1887	.	.	8,600	180	2.1
"	" 1888	.	.	9,031	224	2.5
"	" 1889	.	.	10,225	232	2.3
"	" 1890	.	.	10,931	269	2.5
Total	.	.	.	47,345	1149	2.4

WILLS EYE HOSPITAL, PHILADELPHIA.

Year ending—				Total number of eye cases.	Cases of granular conjunctivitis.	Percentage
December 31,	1886	.	.	7,252	184	2.5
"	" 1887	.	.	8,737	202	2.3
"	" 1888	.	.	9,515	141	1.5
"	" 1889	.	.	9,804	129	1.3
"	" 1890	.	.	11,103	152	1.4
Total	.	.	.	46,411	808	1.7

From the foregoing tables it is evident that the disease under consideration is not such a scourge in this State or in Massachusetts as it is in the State of New York, the figures given tending to show that the proportion of trachomatous to other forms of eye disease is twice as great in the city of New York as it is in Boston, and nearly three times as great as in Philadelphia.

This great disparity, although doubtless caused in part by the maleficent influences inseparable from tenement-house life which obtains on such a large scale in New York, is, in my judgment, mainly due to the fact that that city first receives the great bulk of the immigrants that come to our shores. The average annual immigration through the port of New York for the past five years was 352,734, while the average for the same period for Boston was 34,228, and for Philadelphia 27,991.

But if the interest of the people of the Empire State is greater than ours in the rigid examination of immigrants with the view of lessening the spread of contagious eye diseases, our interest is great enough to demand attention; and, besides, the day is past when we can take a purely local view of any ques-

tion affecting the public weal. We have one flag and one country, and the interests of one portion of it are the interests of all. In this connection I beg to read a letter—in reply to a note asking for information—recently received from Cadwalader Biddle, Esq., Secretary of the Board of Public Charities, acting as United States Commissioners of Immigration :

DEAR SIR: In reply to your communication of the 21st inst., in reference to the examination of immigrants arriving at the port of Philadelphia, I beg to say : The Act approved March 3, 1891, prohibits from landing "all persons suffering from a loathsome or dangerous disease." By the eighth section it is provided that "the medical examination shall be made by surgeons of the Marine-Hospital Service." Dr. George Purviance has been assigned to make such examination at the port of Philadelphia, he being a Marine-Hospital surgeon. Dr. Purviance desires to make a careful personal examination of each arriving immigrant. If such contagious disease is likely to cause the person suffering from it to become a public charge, the Immigration Commissioners would refuse to allow the immigrant to land upon being so advised by the surgeon. Your letter will be handed to Dr. Purviance for his information.

Very respectfully yours,

CADWALADER BIDDLE,

General Agent and Secretary Board of Public Charities,
Acting U. S. Commissioners of Immigration.

It is unnecessary to add that as regards this important matter the interests of Pennsylvania are in good hands.

The other source of chronic contagious conjunctivitis to which I have referred is to be found in our orphan asylums and similar institutions. Years ago when I was a resident surgeon at the Wills Eye Hospital in Philadelphia, there was one town which had a bad preëminence as the source of an unfailing supply of granular-lid cases, insomuch that even the hospital attendants, on recognizing, as they often could before the patient entered the house, the drooping lids and the other appearances characteristic of the disease, used to remark, "Here comes a case from X—." Similarly, for a number of years I have been in the habit of inquiring of trachomatous children what orphan asylum they had lived in. I have, in fact, been so impressed with the importance of this subject, that when I was asked to appear before you in my present capacity it seemed to me that it would be difficult to choose a topic more worthy of your attention.

In order to acquaint myself with the facts I have recently examined the eyes of 1285 inmates of seven public institutions in Western Pennsylvania. The ages ranged from infancy to eighteen or twenty years, the vast majority being from five to fifteen years old. Among these children I found 96 well-marked cases of trachoma, using that word in the narrow sense in which it is employed by Saemisch. The ages of the affected cases were as follows:

Under 5 years of age		None.
5 to 6	" "	9 cases.
7 to 9	" "	34 "
10 to 12	" "	27 "
13 to 16	" "	14 "
17 to 19	" "	12
Total		96 "

In a majority of these cases the external appearances were such that, without everting the lids, the existence of serious trouble would never be suspected. Furthermore, in a majority of the cases no difficulty was complained of. The latter fact is owing in part to the toleration established by the chronicity of the disease and in part probably to the melancholy patience so characteristic of the inmates of orphan asylums.

Among the thirty children in the Home for Colored Children trachoma was wholly absent, whereas follicular conjunctivitis of a mild type was common, facts which seem to corroborate the view that trachoma and follicular conjunctivitis are distinct affections. They also, so far as they go, tend to confirm the conclusions of Burnett in respect to an immunity possessed by the colored race. It is to be remarked, however, that in another institution, which opens its doors to all races, two well-marked cases of the disease were seen in full-blooded negroes.

In one institution, containing 296 children, about equally divided between the two sexes, there were forty-one cases, of whom *all but one were girls*. If one were disposed to generalize from this fact as to the causal influence of sex, his conclusions would be somewhat disturbed by the circumstance that in another institution containing 465 inmates, there were thirty-five cases, *all but three of whom were boys*. In the latter institution, it is true, the boys outnumbered the girls nearly four to one,

but, taking this into account, the relatively large number of male cases is quite striking. In point of fact, among the ninety-six cases the sexes were about equally represented, the girls numbering fifty-two and the boys forty-four. How are we to account for the remarkable statistics furnished by these two institutions? In each the predisposing causes, including the diet and the general sanitary conditions of the two sexes, are the same. There is but one explanation: in the one instance a particularly infectious case happened to gain admission to the female department, and in the other a similar case happened to be admitted to the male department. The statistics in reference to trachoma presented by these two institutions amount, in my opinion, to a demonstration that, while predisposing influences may be necessary, there is practically but one way in which the disease spreads, and that is by contagion. *Omne ex ovo* is an old statement, but it is a fair expression of the tendencies of modern medical and biological opinion. I am disposed to emphasize this point, because some writers apparently exhibit a tendency to minimize the contagiousness of granular conjunctivitis, and to dwell upon the importance of the indirect causes mentioned. Zehender, *e. g.*, says that, given the predisposing conditions plus the chance of contagion, trachoma may appear in a previously healthy eye. He continues: "In diesem Falle ist es aber nicht das Trachom welches inoculirt wird, sondern nur eine Entzündung, welche aus anderweitigen Gründen und unter den vorliegenden Verhältnissen zur trachomatösen Entzündung sich entwickelt."¹ This view is antagonized not only by the statistics already given of the two institutions referred to above, but by the further fact that in each of these institutions the department which was practically free from the disease showed other forms of inflammation, such as follicular conjunctivitis (in the sense used by Saemisch), and especially catarrhal conjunctivitis, in abundance. This was also true of another institution, with about two hundred inmates, among whom no case of trachoma was found.

From the foregoing considerations the conclusion is fairly deducible that it is possible to lessen the ravages of a disease

¹ Loc. cit., p. 117.

which is followed by such disastrous consequences, and that one way of accomplishing so desirable a result is to employ such means as will tend to eliminate it from those of our public institutions which offer a peculiarly favorable soil for its propagation. The measures taken for the attainment of this end must have reference, first, to the rigid exclusion of all new cases, and, secondly, to the prevention of the spread of the malady where it has already effected an entrance.

With regard to the first of these objects, systematic inspection of all new applicants is essential. Such inspection would naturally be more effective if conducted by a physician. But if the demands upon the time of the latter, whose services in such cases are usually gratuitous, should prove too exacting, it would be perfectly feasible for any man or woman of average intelligence to acquire in a very short time all the knowledge and skill requisite for the purpose. In all institutions of the kind alluded to in this paper, *one or more of the attendants should be instructed how to evert the eyelids*, and to detect a departure from the normal condition. Applicants presenting any such departure could be set aside to await medical examination. In reformatory schools, which are more or less penal in character, the rejection of those affected with trachoma would probably be impracticable, and it might be attended with difficulties even in the case of orphan asylums. Granting this, the necessity for the careful examination of new-comers before admitting them is no less imperative, in order that steps may be taken to prevent the contamination of healthy individuals.

As to the second object, the limiting of the disease where it exists, absolute isolation of the infected cases is indispensable. The playground offers ample opportunities for direct contagion, and, especially during the cold months, the pent-up dormitory air may contain, among its other abominations, abundance of trachoma germs, which may have passed through the tear-passages into the nasal chambers, and thence have found their way out with the exhalations. The general ignorance of the first principles of ventilation, even on the part of persons of otherwise fair intelligence, is truly appalling. Hence, most of our churches, theatres, and lecture-halls seem intended to provide "an easy method" of enabling us

to breathe over and over again the emanations from our own and our tuberculous neighbors' lungs. Even in some of our hospitals the patients, in the winter season, must either breathe air that is saturated with germs of disease and odors unspeakable, or be exposed to cutting draughts from open windows, which may change the road to convalescence into "the way that leads down to death." Small wonder then that the poor wail in the orphan asylum, who, perhaps, should thank his stars that he has a roof over his head, does not enjoy the benefits of scientific ventilation. In some asylums, under existing arrangements, segregation of the affected cases would be extremely difficult on account of their crowded condition. Unfortunately, these are the institutions where the failure to adopt this measure would be attended with the most serious results. Some way must be found, therefore, of surmounting the difficulty.

In view of the remarks previously made in regard to the dangers attendant upon the use of a single towel by two or more persons it seems scarcely necessary to say that the allotment of one of these articles to each individual, for *his or her exclusive use*, is of the first importance. This measure should be adopted in all institutions whether trachoma is present or not. It has occurred to me that the philanthropist who shall establish an Orphan Asylum Towel Fund, the income from which shall be devoted to the adequate supply and the cleansing of these toilet adjuncts, will set on foot an agency for good the possibilities of which are beyond conception.

In reference to this subject of stamping out a disease which can entail so much misfortune, there are one or two considerations which may be lightly touched upon. In the first place the difficulties will necessarily multiply with delay. The sooner the proper measures for the exclusion or isolation of infected cases are instituted, the more easily will the work be accomplished. In the second place, it might become a question as to how satisfactorily institutions, whether under private or State control, in which there is a chance of eyesight being lost or seriously impaired through contagion, are carrying out the purposes for which they were founded. In the third place, the presence of contagious conjunctivitis in orphan asylums is sometimes attended with practical disadvantages which might

not be anticipated. Not long ago a lady who was about to adopt an asylum child requested me to examine the latter for some weakness of the eyes. In reply to pointed questions I was compelled to state that the child had a contagious form of ophthalmia, which would be very difficult to eradicate, whereupon the lady, disregarding my appeals to her humanity, positively refused to carry out her original intention. But arguments of a utilitarian nature are fortunately not required. The necessary measures will undoubtedly be adopted once the persons who are responsible for the management realize the true nature of the situation. From personal observation I am convinced that the presence of granular conjunctivitis in public institutions is not due to intentional neglect, but to a want of knowledge of its gravity and of the mode of its detection. The men and women who are directly or indirectly connected with the Board of Public Charities, and those who are concerned in the administration of each particular institution, will doubtless look with a favoring eye upon any means by which the good results of their voluntary and unselfish labors may be so greatly enhanced.

It will have been observed that this paper concerns itself with but one form of contagious conjunctivitis, viz., trachoma. The reason is that this disease is inconceivably the most important of the ocular affections which are apt to be found in public institutions, being the one, *par excellence*, which is liable to produce permanent impairment of vision. Other contagious and only less serious forms of conjunctival disease, among which I may mention catarrhal and follicular conjunctivitis, the production of which is favored by the same predisposing influences as tend to engender trachoma, and which are, therefore, seen in abundance in orphan asylums and kindred establishments, can be suppressed only by the adoption of measures similar to those suggested for the elimination of granular conjunctivitis.

Summing up :

1. Blindness in this country is increasing out of proportion to the increase in population.
2. Granular conjunctivitis is an important factor in producing impairment of vision.

3. Granular conjunctivitis is a contagious disease, and its dissemination is effected largely through the agency of orphan asylums, orphan and reform schools, and similar institutions.

4. Granular conjunctivitis can be excluded from institutions in which it has not already gained a foothold by rigid inspection (including systematic eversion of the eyelids) of all new applicants. This inspection, in the absence of the physician, might be made by a specially trained lay attendant.

5. The further spread of granular conjunctivitis in institutions where it exists can be prevented by absolute isolation of infected cases, and by the allotment to each individual of a towel for his or her exclusive use.

6. In every institution of the kind above referred to, examinations of *the eyes of all the inmates*, preferably by a specialist in eye diseases, should be made at stated periods, not less frequently than twice a year.

7. In every institution each child should have his own towel *and use it alone*, and appropriate penalties should attend infraction of this rule.

8. The efficacy of the above measures will be greatly enhanced by close attention to general sanitary requirements, including adequate ventilation, personal cleanliness, as varied diet as possible, etc.

9. The means suggested above will be found useful in the elimination of other contagious though less serious eye affections, such as follicular and catarrhal conjunctivitis.

